Volume 19 April, 1933 *Number 4*

Lubrication

A Technical Publication Devoted to the Selection and Use of Lubricants

THIS ISSUE

Laundry Machinery

Construction and Lubrication

PUBLISHED BY
THE TEXAS COMPANY
TEXACO PETROLEUM PRODUCTS

WHAT PRICE CHEAP LUBRICATION WHERE EXCESSIVE HEAT AND WATER PREVAIL

?

IN THE lubrication of laundry machinery, where high temperatures and excessive water conditions prevail, the effectiveness of the lubricant used should be the first and only consideration.

Take the ironing machine, for example: The oil used here *must not* break down—as an inferior oil most certainly will. The constant high temperature will cause inferior oil to break down and thicken up, leaving a carbonaceous residue, which tends to hinder the flow of oil to the bearings of the machine.

Moreover, with inferior or unsuitable lubricants in the washroom there is always the possibility of water working into the bearings and washing off the former. A bearing is thus robbed of its lubricating protection, and abnormal wear develops. Designers of the most modern and up-to-date laundry machinery in use today, realize the abnormal conditions under which such machines must work, and provide bearings as nearly absolutely water-tight as possible.

But heat and water have such great penetrating powers that, in the last analysis, the proper lubricant—one that will not break down under heat, and will effectively seal the bearing clearances against the entry of water, is the best assurance for satisfactory performance.

Among the complete list of lubricants manufactured by The Texas Company, there are oils and greases exactly suited to the laundry machines in your plant. They are approved and recommended by the most prominent designers and manufacturers of laundry machinery, and in highly satisfactory use in many laundries throughout the country.

We shall be glad to consult with you regarding the application of Texaco Lubricants in your plant.

TEXACO

THE TEXAS COMPANY—*Texaco Petroleum Products*
135 EAST 42nd STREET, NEW YORK, N. Y.

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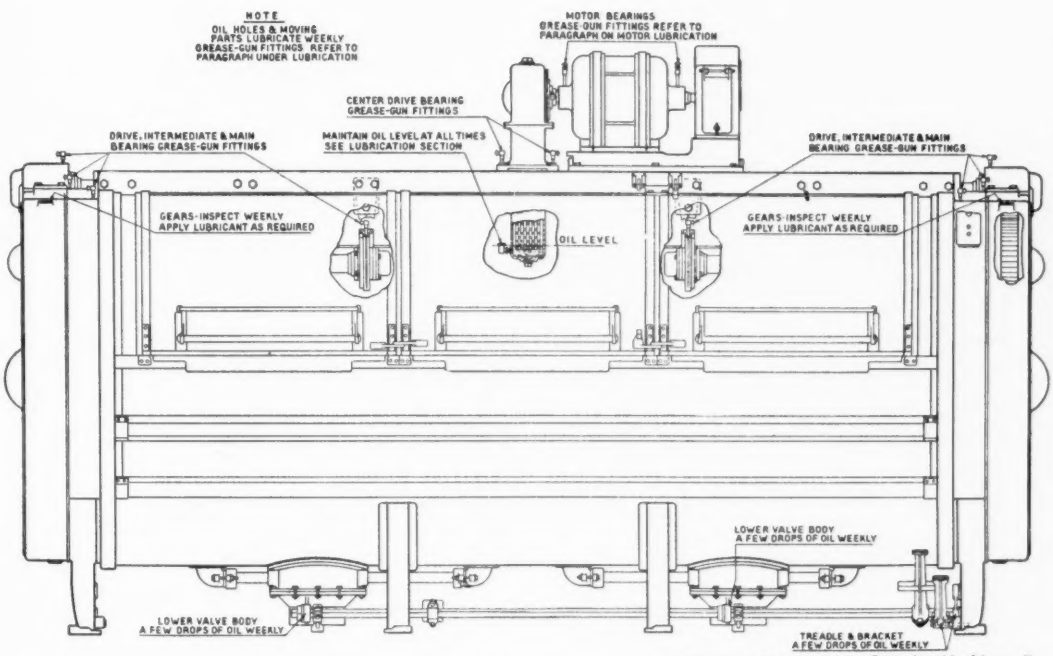
Published by

The Texas Company, 135 East 42nd Street, New York City

Vol. XIX April, 1933 No. 4

Change of Address: In reporting change of address kindly give both old and new addresses.

Laundry Machinery—Construction and Lubrication



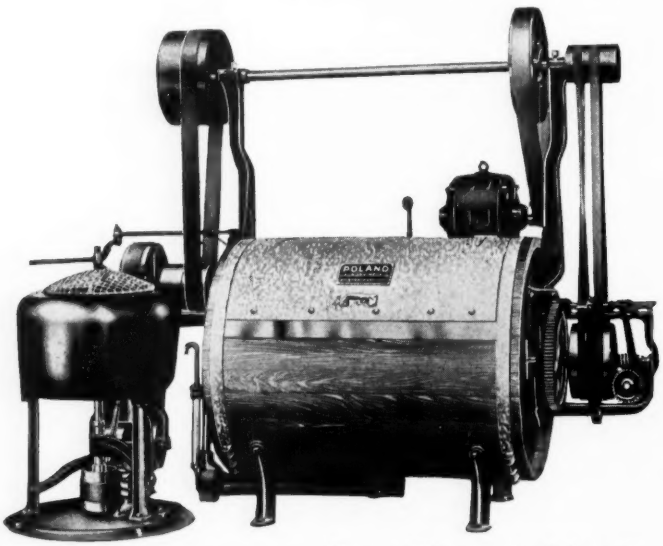
Courtesy of The American Laundry Machinery Co.

Fig. 1—Lubrication diagram of the American Super Mammoth Cascade Washer, showing all parts requiring lubrication, with instructions as to application. Motor bearings may be equipped with ball bearings, ring oilers, or waste packed reservoirs. Where grease lubrication is called for, care should be taken to add grease sparingly, by means of pressure gun, in order to eliminate possibility of over-heating.

IN an age when the daily per capita consumption of water ranged in the neighborhood of one gallon, cleanliness was just one of those loosely used terms, advantageous to be sure, but difficult of attainment in full measure. As a parallel, the family wash was a matter of somewhat secondary consideration.

Development of our modern methods of living, however, caused marked increase in the daily consumption of water per person, and

cleanliness became a byword because it was so intimately connected with health. Coincident with this development and its enhancement by the growth of the apartment mode of living, we were to cast off the drudgery of "wash day," particularly in cities where concentrated living has been so highly developed. To take its place the modern steam laundry industry has come forward as one of the most advanced steps in our labor saving program.



Courtesy of Poland Laundry Machinery Co.

Fig. 2—Showing the Poland "Laundry Unit." Note relative location of extractor to washer, and manner of installation of driving mechanisms. Note provision for lubrication of driving shafts.

As a consequence, production of laundry machinery has reached such a proportion as to demand a distinct place in the field of mechanical and lubricating engineering, and their care, upkeep and lubrication are factors that should be of more than passing interest to all concerned.

The development of such machinery has involved certain problems of specialized design with particular respect to driving mechanisms, bearing construction, and protection of the materials being handled. The greatest care must be exercised in the handling of each individual piece to avoid tearing, staining or mutilation. One of the most important factors in this connection is proper application of lubricants by methods designed to promote economy and protection of the moving parts.

Laundry operations can be divided into two parts in studying lubrication, according to the operating conditions which the lubricant must meet. These involve:

Washing or cleansing

Finishing

In many cases the former is a class of laundry work in itself. The so-called "finished laundry," on the other hand involves both operations. Such a plant requires the greatest variety of machinery due to the type of goods handled, which may vary all the way from overalls, etc., to the finest laces and lingerie. It is with such machines that the lubricating engineer will most usually have to deal, and where lubricants will be subjected to the most exacting service.

WASH ROOM EQUIPMENT

The first operation in modern steam laundry practice is washing. While essentially a cleansing process, it is practicable to combine rinsing, starching, sizing, bleaching and blueing operations while the clothes are still in the washing machine.

Washing is accomplished by rotation of a perforated inner cylinder, which is fitted with special perforated ribs extending radially. These, it is claimed, insure clothing getting the necessary drop, and increase the rapidity of the washing process.

Washing Machine Construction

The modern washing machine consists of a water-tight outer casing which may be of wood, brass, monel metal or galvanized iron. Within this outer casing is fitted the perforated inner cylinder, which may be of wood, brass, galvanized sheet iron, or monel metal, consisting either of one large compartment or individual compartments as desired.

Operation is based on the principle of rotary motion, periodically reversed, in order to insure thorough agitation of contents with the cleansing solution, and prevent tangling of garments. Rotation of the inner cylinder is accomplished by a suitable mechanism equipped for reversing, automatic starting and stopping. The driving mechanism may be of the independent or central motor type (via suitable shafting, etc.) the washer being belt connected or equipped with suitable gearing. Large type machines have a driving connection at both ends. On smaller installations, however, one end drive is sufficient.

Suitable inlets and outlets are installed for filling and emptying, and are operated by a timing mechanism. Such valves as desired are located usually below the casing. The steam inlet likewise is installed at the lower part of the outer casing. In modern practice, to insure against discoloration, clothes are separated and washed in batches according to type, color, and grade. Overloading of the machine is cautioned against, as washing will not be complete. Excess chemicals should never be

used to aid the natural cleansing action of pure water and high grade soap.

Clothes may be washed loose, or the non-identification or net system may be used. The latter eliminates the identification of each piece of material in the bundle, and also undesirable marking of the clothes. In some laundries the net is claimed to take the major part of the strain in handling; it is also regarded as a means of preventing lost articles. In other prominent plants where non-objectionable markings are practicable, use of the full identification system has been found to be highly satisfactory.

Extractors

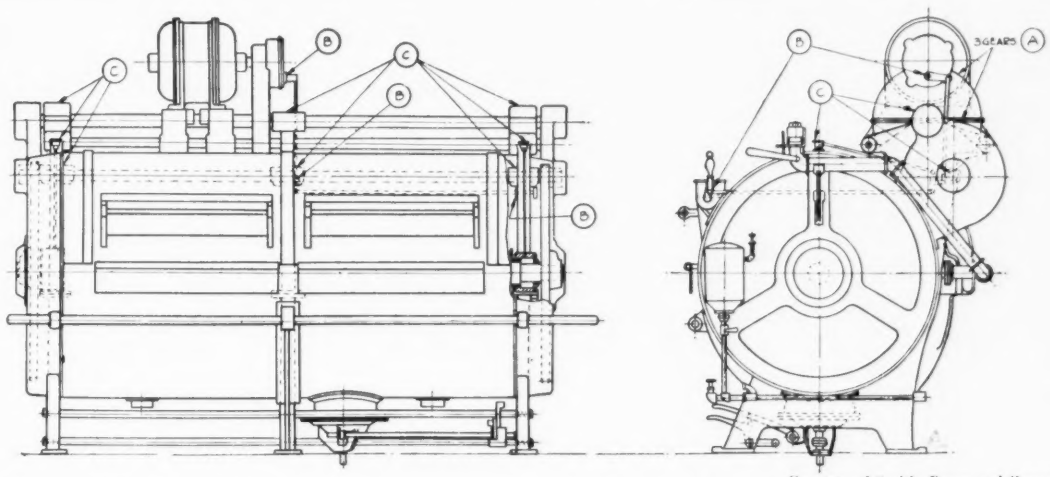
After suitable washing, rinsing, bleaching, blueing and starching, all of which is brought about in the washing machine, the clothes are transferred to the extractor or centrifuge. The purpose of this machine is to extract excess water by utilization of the principles of centrifugal force, and yet leave enough moisture in the materials for finishing.

Constructional Details

As most usually constructed an extractor consists of a cast iron or wrought steel outer casing containing a perforated cylindrical metal basket fitted to a vertical shaft which is suitably arranged for belt, texrope or motor drive either from overhead or below. Upon rapid rotation of this basket the clothes are forced tightly against the side of the basket, the water being forced out through the perforations, to drip to the bottom of the outer casing and thence pass to the drain.

General practice in extractor construction is to install safety covers whereby it is impossible to start the machine with the cover raised, or to raise same while the basket is in motion. A locking brake and an adjustable friction clutch are other accessories which are recommended both for the safety of the operator and the machine, and to obviate sudden straining of the clothes as much as possible, which violent starting or stopping might promote.

Extractors are driven almost entirely by belts, or texrope, operated either from the same shaft as the washer, or independently. Overhead drive extractors have come into prominence in many instances where it is desired to handle heavy loads and where excessive vibration in the base or lower parts has been an objection, such as in service on other than ground floors of buildings. In one type of machine the basket driving mechanism and outer casing swing from the apex of a tripod by a universal joint. Oscillation of the basket within the curb or outer casing is prevented by bearings at the upper and lower ends of the main spindle, the lower bearing being in the bottom of the casing.



Courtesy of Smith, Drum and Company

Fig. 3—Lubrication chart for Smith, Drum motor driven washer. Points marked (A) require lubrication with a high grade gear compound of approximately 1000 seconds Saybolt viscosity at 210 deg. Fahr. Parts marked (B) should be oiled with a high grade, medium viscosity machine or engine oil. Parts marked (C) require grease of medium consistency.

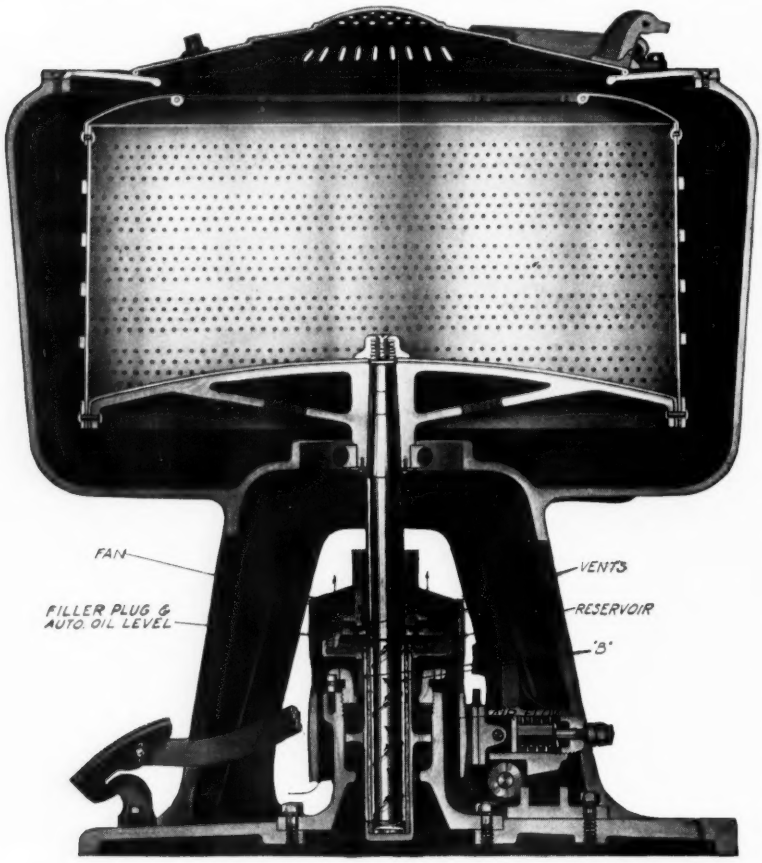
Starch Extractors

The use of starch extractors is claimed to promote efficiency and rapidity of operation, enable ironing to be done with less heat, reduce wear and tear on the clothes, insure even distribution of starch, and give a better finish. These machines are constructed and operated very similarly to the regular water extractor, employing the principles of centrifugal force to extract excess starch and moisture.

Clothes and Dry Room Tumblers

It is frequently desirable to loosen clothes after partial drying in the extractors, so that

they may be readily and rapidly separated without injury and have the lint shaken out prior to ironing; or in the case of rough dry laundry, completely to dry the pieces by extensive agitation under high temperatures. For such purposes the clothes tumbler is used.



Courtesy of Troy Laundry Machinery Co., Inc.

Fig. 4—Sectional view of the Troy Vertical Motor Driven Marathon Extractor. One of the features of this machine is automatic oil circulation from the top reservoir, as shown, down through two holes on the sides of the bearings, indicated at "B". Basket spindle is lubricated by pumping action of the spiral groove cut in the spindle bushing, oil flowing upward as indicated by short arrows. The long arrows indicate flow of air to the fan at the top, which maintains low operating temperatures within the element. By this means marked temperature reductions have been attained. Driving motor is of the ball bearing type

In construction the tumbler is quite similar to the washer, consisting essentially of a wood or metal outer casing, a wire mesh or perforated metallic revolving inner cylinder, and the driving mechanism, the latter being installed generally at one end only. Modern construction leans toward reversible rotation of this inner cylinder, the same as for the washer, it being considered that less power is used and better aeration and loosening of the goods result. Tumblers are especially useful in the handling of stiff collars, as they remove lint effectively and open the fabric so as to afford uniform starch penetration and reduce subsequent wiping by hand. Loading of tumblers is carried out from the front; unloading may be done from the same opening, or in certain types of machines from underneath the outer casing directly into a special receiver.

When tumblers are used for rough drying purposes they are usually equipped with steam heating coils and special air ventilating devices to insure as rapid drying as possible and free circulation and escape of saturated hot air and lint.

FINISHING EQUIPMENT

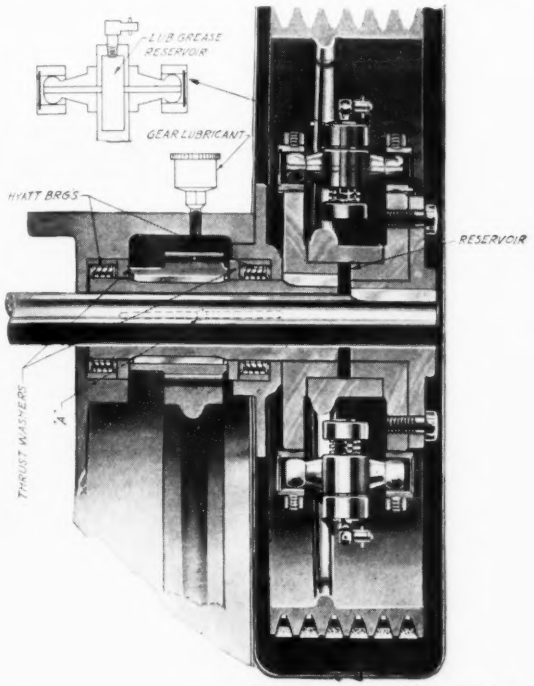
The finishing process in laundry parlance involves a number of more or less intricate machines, depending on the type of goods to be handled. With the exception of collar dampeners, starchers and shapers, they all embody the ironing or pressing idea.

Ironing Machines

The flat work ironer is the chief machine of this class. As most usually constructed, it consists of one or more padded rolls of about 12 inches in diameter and 8 to 10 feet long, revolving in conjunction with concave steam heated shoes or chests, with which the pieces come in contact in passage through the machine. Pieces as discharged may either be fed back to the operator, as is the practice on smaller single roll machines, or else deposited at the opposite end of the machine for subsequent folding, etc.

To give a finish to the reverse side of the goods the steam chest for the last roll is inverted in certain types of ironers. Modern practice is leading towards machines which will iron on both sides of the goods. Thereby uniformity of pressure is gained, tails, string marks and other defects or imperfections on the ironed surfaces are eliminated, and the finished goods are given a practically faultless appearance. The purpose of using a multi-roll machine is to speed up rate of operation and still obtain a practically bone dry finish at one rolling. Where single roll machines are used, the rate of rolling must be carefully regulated in accordance with the size and extent of dampness of the goods, and the steam temperature

available. It is considered poor operation to have to re-iron any piece due to incomplete drying. Driving of flat work ironers may be either accomplished by belt connection from the driving motor or through reduction gear units.



Courtesy of Troy Laundry Machinery Co., Inc.

Fig. 5—Details showing lubrication of balancing differential for the Trojan balanced drive washer. (A) indicates point of grease application at rear of the drive for the Hyatt bearings, the grease passing via the greaseway as indicated by dotted lines. Gear lubricant is handled to the driving pinion by cup, as indicated, flow of lubricant being controlled by the size of the discharge orifice in the cup. At upper left is shown lineal details of the balancing element and proportional size of the grease reservoir.

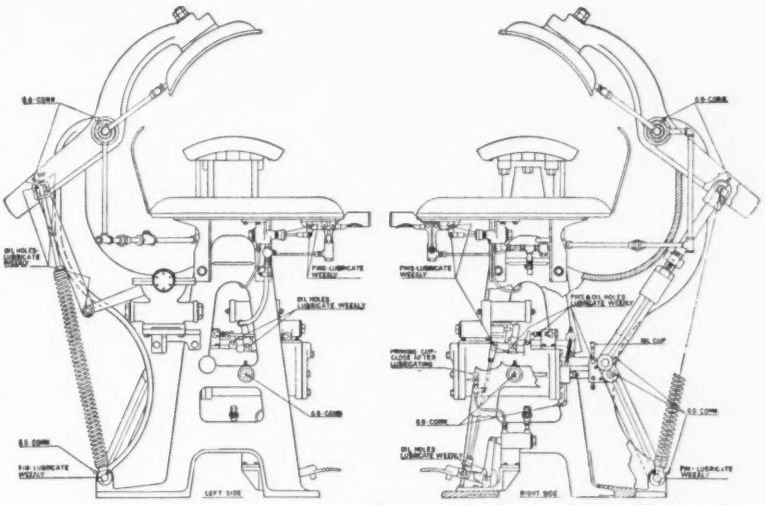
To enable ironing to a soft, lustrous finish, certain types of flat work ironers are built with one or two large cylinders (of 3 to 4 feet in diameter, and about 10 to 12 feet long). The steam is fed directly to the cylinders at full boiler pressure (about 100 lbs. per square inch) through a combination fitting at one end of the cylinder. Condensate passes out through this same fitting. Sealing is effected by use of stuffing boxes. To augment the capacity of the machine and gain increased heating surface under pressure usually from 5 to 8 padded rolls (of about 8 in. diameter) are installed to press on the upper surface of the main cylinder. Padded rolls on certain machines are constructed with an automatic raising device whereby they may be easily and quickly lifted from contact with the main cylinder. Pressure of these rolls can be regulated according to the type of goods and grade of finish desired.

Safety devices are an important feature on all types of ironers. Usually finger guards are installed on all machines which automatically and instantly stop the machine if very light pressure is applied. Most manufacturers now build pressing machines with cage guards designed for two-hand control.

Starching Equipment

Collar and cuff starchers have been developed to meet the necessity for treating such goods with a greater amount of starch than any other type of clothes. One prominent type consists of one or more large brass drums suitably covered with starcher felt and cheese cloth, and designed to rotate in contact with a series of corrugated brass rolls, the rolls and lower part of the drums being immersed in a pan of starch solution.

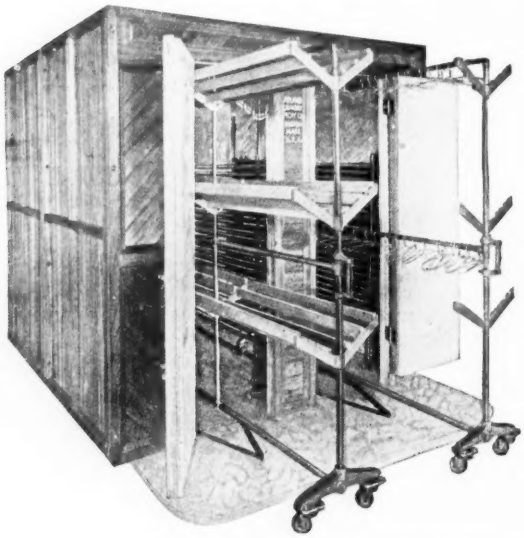
In operation the pieces to be starched are fed onto a carrying apron and led through the solution between the rolls and drum. The necessary pressure between these latter is attained by adjusting springs whereby the extent of starching can be controlled. On leaving the solution the goods pass between suitable rolls which wipe and remove excess starch. Operation of the machine is carried out by gears attached to the drum shafts, meshing with suitable worms, belt driven from either an independent motor or a central driving shaft.



Courtesy of The American Laundry Machinery Co.

Fig. 6—Lubrication chart for the American Eagle full automatic air press. "GG" indicates grease gun connections. Manufacturers recommend application of grease by pressure gun once a week. Periods for lubricating oiled elements are indicated.

Other types of starching devices are the Dip Wheel, and Barrel Collar Starchers, Shirt Bosom Starchers, Wristband Starchers, and Cylinder Starchers for semi-stiff goods such as ladies' dresses, flat work, etc. While the above



Courtesy of Poland Laundry Machinery Co.

Fig. 7—Details of the Poland Hurricane Dry Room. By constant agitation of air and the location of the goods to be dried as near as possible to the coils, rapid and even drying is practicable.

differ widely in construction, essentially they embody the same principle of impregnating the goods with starch under adjustable pressure. Operation is carried out by motor power through direct gear reduction or belt drive.

Dry Rooms

Due to the necessity for thorough drying of certain types of starched goods, such as collars, cuffs, shirts, etc., prior to finishing, dry rooms are frequently installed. They are also often used for rough-dry laundry instead of a rotary drying tumbler.

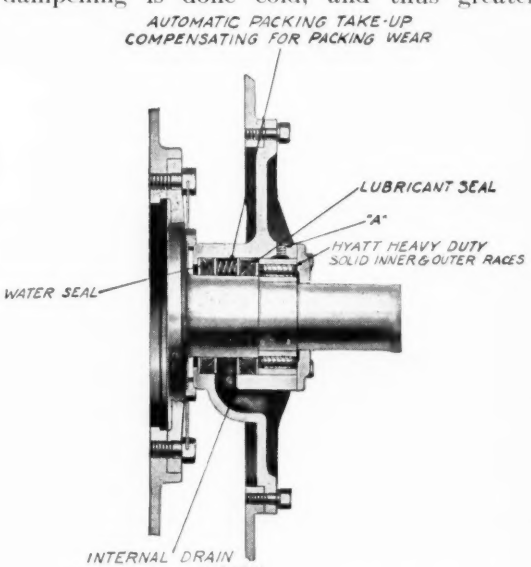
The equipment will normally consist of a steam heated compartment built either of wood or galvanized iron. In the conveyor chain type the chain passes around suitable guides, the latter being driven from the exterior top of the compartment by bevel gearing controlled from a variable speed counter-shaft which may either be belt-connected to a main operating shaft or run via reduction gearing from a small motor. From the conveyor chain are suspended the clothes hooks. As the goods are carried round and round within the compartment they are all subjected to a constant temperature which is maintained by steam coils, and draft fans, which also serve to circulate the air.

Dampening Starch Goods

Prior to final ironing of stiff starched goods, it is essential that they be uniformly dampened. Three types of machines have been devised to serve this purpose, i.e., the roller type, the vapor dampener, and press type.

The roller dampener may use either a system of rolls or a travelling apron. As generally constructed the former involves a pair of water conveyor rolls operating in suitable pans wherein the water level is automatically maintained constant. In contact with these are a pair of larger, rubber-covered rolls. Water is carried to the latter by the conveyor rolls and dampness is actually pressed into the goods as they pass between the rolls. Excess water is squeezed out by passing the goods between stripper rolls in contact with the rubber rolls, prior to discharge from the machine. The rolls are driven through gears and belt connections.

In the vapor dampener the goods are treated with hot water vapor in an enclosed galvanized iron container. The water entering the machine is passed successively through an injector, which converts it to a fine mist, and a strainer prior to contact with the goods. Penetration occurs much more rapidly than when dampening is done cold, and thus greater



Courtesy of Troy Laundry Machinery Co., Inc.

Fig. 8—Trunnion bearing for the Trojan balanced drive washer. Note installation of Hyatt bearings, with point of lubricant supply indicated at "A". Note also the location of lubricant and water seal and automatic packing take-up to compensate for packing wear. The internal drain carries off all water and any leaked lubricant. No lubricant or washing solution can pass this drain since it is not under pressure. This prevents entry of contaminating foreign matter into the washer or bearings.

capacity and efficiency is developed by such a machine. The press type dampener, in turn, operates on the principle of actually pressing the moisture into the goods by means of steam, air or water pressure.

Special Machinery

Following the process of starching and dampening, pieces such as collars and cuffs are ironed in machines designed especially for this purpose. In principle these machines are constructed much the same as the single cylinder flat work ironer, using small padded rolls operating in conjunction with a steam heated central cylinder. The driving mechanism is also similarly designed. The number of rolls used will vary with the size of the machine, as well as its capacity.

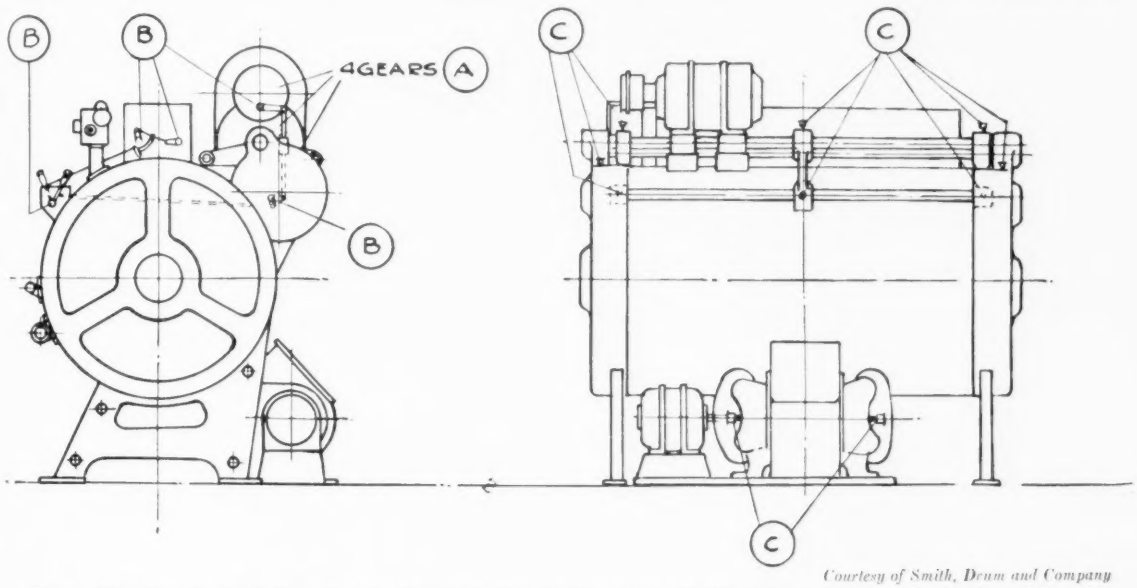
Other types of finishing machines used in the modern steam laundry are: collar shapers, seam dampeners and shapers, art edge ironers, neck-band and wrist-band ironers, shirt body ironers, bosom ironers, cuff presses, etc. In general, they embody many of the principles already considered, finishing either by roll or press, being electrically operated by suitable gear reduction, or by use of pneumatic pressure through proper arrangement of lever mechanisms.

Washing Machines

In the washing machine lubrication is necessary on the main bearings, driving gears, shaft bearings, float and reversing mechanism. Main bearings may require grease or oil, according to design and construction. Where oil is necessary they should be lubricated with a medium heavy mineral oil of about 300 to 500 seconds Saybolt viscosity at 100 degrees Fahr., the lubricant being applied by oil cups, or simply squirted in from a can onto a bed of lamp wick packing set in the oil well.

It is also practicable to use grease, delivering same through pressure grease cups or pressure gun fittings. In general, a non-soluble or water-resisting grease should be used, of medium consistency, such as a cup grease. There is always possibility of the water level in the machine being too high, and leakage through the main bearings occurring. The water, being of a soapy nature, lubricates to some extent, but it should never be relied upon solely for this purpose. It is best practice to use a lubricant of sufficient body to resist effectively this washing action of the water. Certain machine designers provide for protected lubrication by constructing liberal oil chambers in the main bearing boxes, which can be packed with hemp, etc., and fitted with removable weights.

While gearing should normally present no difficulty from a lubrication point of view, the



Courtesy of Smith, Deum and Company

Fig. 9—Oiling chart of a Smith, Drum Tumbler. Parts marked (A) should be served with high grade gear lubricant, of a viscosity as indicated in Fig. 3. Parts marked (B) should be lubricated with a high grade medium heavy viscosity machine or engine oil. Parts marked (C) should be lubricated with grease of medium heavy consistency. Self-aligning roller bearings are used on cylinder trunnions. Heavy duty roller bearings are used on all drive shafting. All gears are completely housed to prevent leakage of gear lubricant, and insure effective lubrication.

LUBRICATION REQUIREMENTS

The possibility of entry of water into the bearings or other lubricated mechanisms of certain types of washing machines and hydro-extractors presents a problem which should be given careful attention particularly in the choice of lubricants. In the washing machine high water and consequent sluicing out of the lubricant, or the presence of alkali must be considered. In the hydro-extractor pressures may also be developed which the lubricant must be capable of resisting effectively if the contact surfaces are to be protected.

fact that a certain amount of oil leakage will be prevalent from the main bearings, etc., presents a condition which may often be misinterpreted. In many plants the operators rely on this dripping to lubricate their gears, occasionally giving the latter a shot of fresh

Courtesy of Huebsch Manufacturing Company

Fig. 10—Rear view of the Huebsch drying tumbler, showing location of steam coil on top and relative location of the motor. Note also means for lubricating cylinder bearings, and chain guard to geared-head motor. All equipment is enclosed, to prevent leakage of lubricant and facilitate lubrication.

oil. This, however, is not good practice. Shaft bearings, float and reversing mechanisms require a medium heavy bodied machine oil within the viscosity range mentioned above. An oil of such viscosity cannot give adequate protection of gear teeth. It will be far better to lubricate these latter with a product specifically designed for gears, having a viscosity of around 1000 seconds Saybolt at 210 degrees Fahr. Such a lubricant will also resist the washing off action of water.

Lubrication of the driving shaft carrying the header pulleys on certain types of machines is carried out by means of grease cups, using a good medium bodied compression cup grease. The driving end of the shaft is hollowed out in part, with suitable grease ducts cut therefrom to the outer surface, the cup being screwed in the end of the shaft. Some types have reversible headers fitted with ball bearings on which a lubricant of similar consistency can be used. Other belt-driven machines have the header elevated and all the working parts subjected to wear operate submerged in oil.

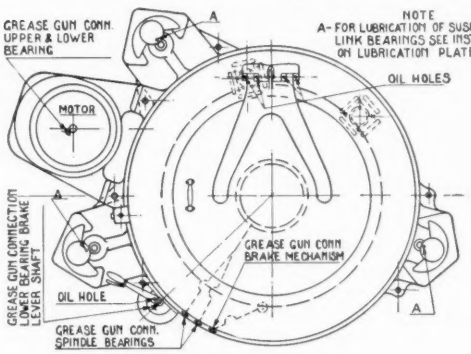
Hydro-Extractors

In studying the lubrication requirements of such equipment, particular consideration should be given to the vertical spindle bearings. In some under-driven machines spindle lubrication can be accomplished by use of a special spindle oiling system where free circulation of the oil is possible. In others, having an upper and lower ball bearing, grease lubrication is provided for. See Fig. 11.

On an over-driven extractor both the upper and lower spindle bearings are generally designed for self oiling, being fitted with suitable equipment to insure continuous supply of oil. In such machines the upper bearing will require the most attention. Wick feed lubrication has been found to be especially suited to this mechanism. To insure positive and continuous oiling, the wick should be held in the oil reservoir around the spindle by a movable metal ring. The bottom bearing carries an oil well with filling pipe attachment. On such bearings a highly refined machine oil of from 300 to 500 seconds Saybolt viscosity at 100 degrees Fahr., has been found to give excellent results.

Driving Mechanisms

Other parts requiring lubrication are the driving pulley bearings, the supporting pivots (for an over-drive machine), safety cover hinges, lifting mechanism, and motor bearings. The same grade of oil as mentioned above will



Courtesy of The American Laundry Machinery Co.

Fig. 11—Lubrication chart for the American O. T. Extractor. Note instructions for oil and grease lubrication. Gears in the housings of the belt drive mechanism should be lubricated weekly. All parts should be thoroughly cleaned before lubricating, to insure against contamination of fresh lubricant.

be found adaptable for all these and any other minor wearing parts, although grease lubrication may be possible on certain of these parts, such as the pulley bearings. In such cases a good medium bodied compression cup grease will be suitable, provided it is water resistant

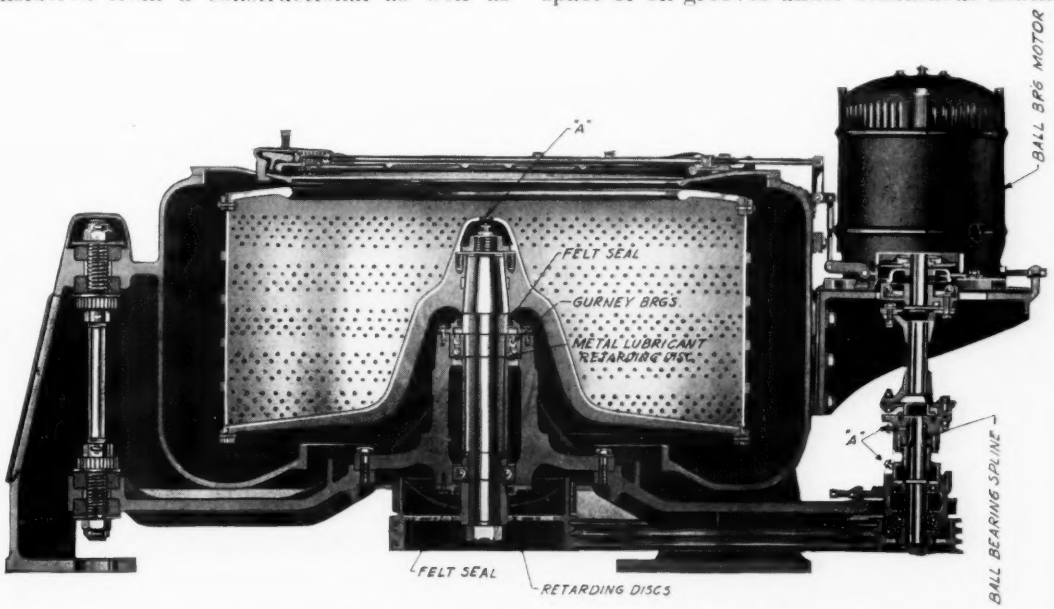
and capable of being retained within the clearance spaces without undue leakage and dripping.

Ironing and Finishing Machinery

Lubrication of ironing machinery must be considered from a constructional as well as temperature angle. The usual temperatures which prevail adjacent to the average steam-heated cylinder type ironer warrant discussion of the lubrication of such equipment from the high temperature viewpoint. In general the greatest difficulties will be encountered with the large, flatwork ironers. In the single or multi-roll type where steam chests are employed, but little direct heat is transmitted to the roll bearings, etc., or driving mechanism.

On the large steam cylinder machine, however, this factor of conducted heat is a constant source of trouble. The bearings of this cylinder will become abnormally hot due to the continuous passage of steam and hot condensate through the hollow shafting. Constant exposure to such heat requires that the oil be of sufficient viscosity that it will not run and get on the goods, aprons, or drip to the floor.

Careful lubrication and selection of the oil is therefore important in the interest of meeting these requirements and preventing dangerous overheating of bearings. Fortunately high speeds or great pressures do not prevail. In general practice such bearings as are subjected to intense heat can be lubricated with a high viscosity straight mineral cylinder oil, of about 135 seconds Saybolt at 210 degrees Fahr. Grease is also practicable where means are provided for its application. Special attention, however, must be given to choice of a grease which will stand high temperatures, otherwise it may tend to set or harden in the clearance space or oil grooves under continuous heating.



Courtesy of Troy Laundry Machinery Co., Inc.

Fig. 12—Cut-away view showing internal construction of the Troy Mercury Extractor. This is of the under-driven Texrope type, equipped throughout with ball bearings. (A) indicates point of lubrication at the top of the spindle. Manufacturers recommend overhauling of their lubricating system yearly. Over-flow of grease from the top bearing carries to bottom bearing of basket spindle and drive shaft. The ball bearing spline serves the purpose of a universal joint in taking care of lateral motion.

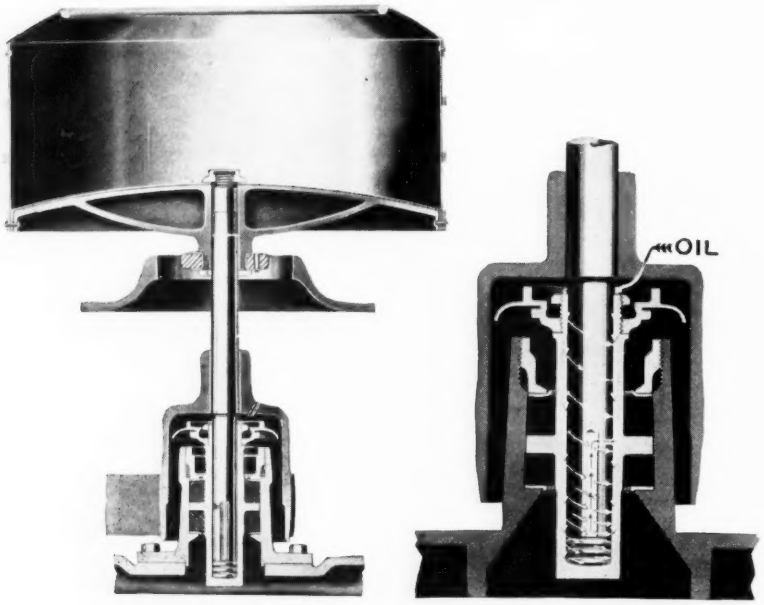
Gears should be lubricated with a high viscosity straight mineral gear compound of from 1000 to 2000 seconds Saybolt at 210 degrees Fahr. Other external parts, and such driving mechanism as is installed can be satisfactorily lubricated with a medium bodied machine oil.

Auxiliary Machinery

Clothes tumblers, dryers, starch extractors, starch mixers, collar ironers, presses, dampeners, starchers, collar shapers, collar moulders, and other small work finishing machines involve practically the same principles of operation and lubrication as have been discussed in connection with the larger units. They are usually motor driven, through central shafting or separate motors, with belt connections, gear reductions, bearings and minor external operating mechanisms where necessary.

On all such bearings, shafting, pulleys and other wearing parts a high grade machine oil of around 300 seconds Saybolt viscosity at 100 degrees Fahr., will be satisfactory. On gearing, the heavy gear lubricant stated above should be used. Specialty machines will vary considerably in construction and the means installed for lubrication, hence the operator

should study such equipment carefully and make sure he does not overlook any parts when oiling. A lubrication diagram is particularly helpful in this regard. None of these machines are high speed nor will they involve any special difficulties if lubricants of proper characteristics are used and properly applied.



Courtesy of The American Laundry Machinery Co.

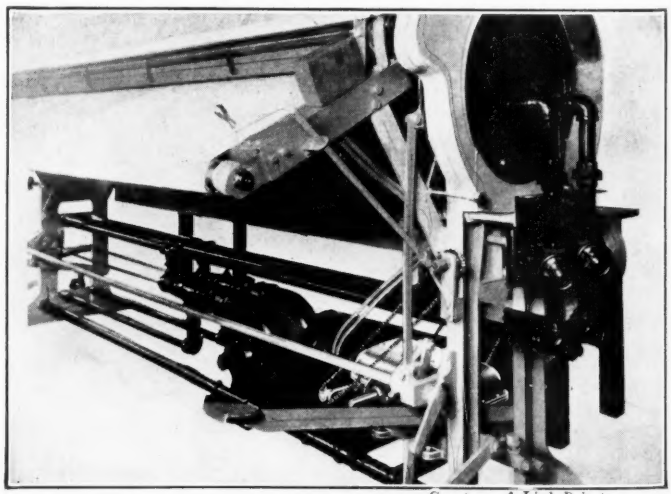
Fig. 13—Sectional view of the American under-driven extractor. To the left is shown general construction with essential parts indicated. At the right is shown sectional view of the automatic spindle oiling device. In this device the oil reservoir at the base of the spindle retains oil and feeds it centrifugally to the bearing as required. This oiling device automatically pumps oil from the reservoir keeping the spindle flooded with lubricant and the bearing cool at all times.

The Influence of Temperature

Operating temperatures are worthy of special consideration in a study of laundry machinery lubrication, for high temperatures in particular will usually impose a greater duty upon a lubricant than any other phase of operation. In connection with this matter of temperature, it must be remembered that the inherent possibility of development of solid friction will always be present. Solid friction between any two surfaces in motion with respect to one another implies the presence of heat, which is invariably developed by the occurrence of friction.

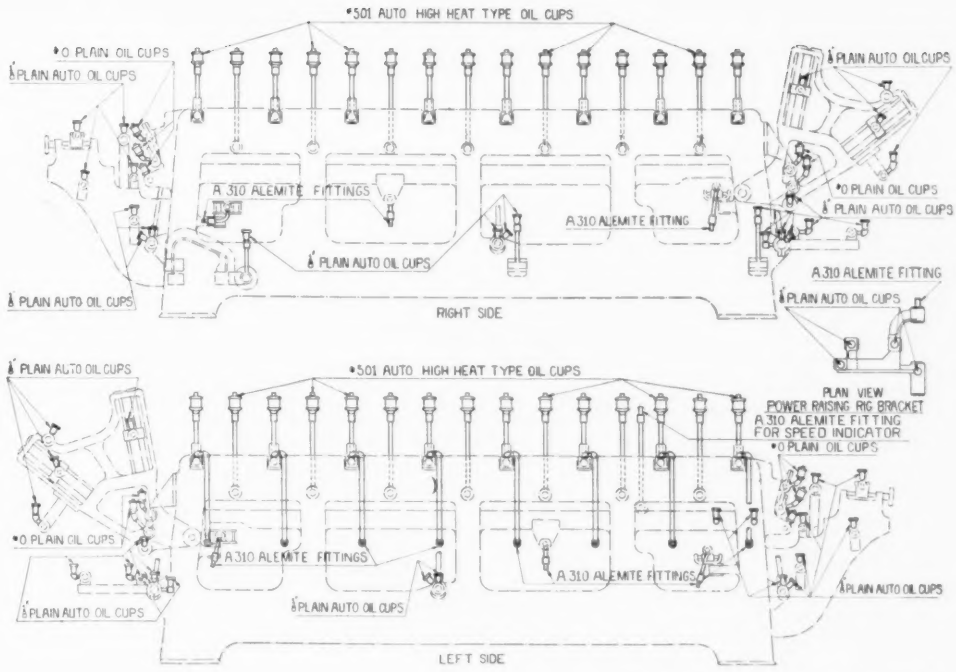
It is the function of lubrication to eliminate solid or metallic friction, supplementing it with fluid friction, which will normally be of far less intensity. Where high operating temperatures may prevail the proper viscosity or body of a lubricant must be given all the more careful attention, for viscosity will vary inversely with temperature. In other words, the higher the operating temperature the greater will be the tendency for the body or viscosity of the lubricant to be reduced. If the original viscosity is not sufficiently high to allow for this reduction, the increased fluidity may lead to impairment of the lubricating film to such an extent as actually to cause metal-to-metal contact.

This will be especially apt to occur under pressure. It is for this reason that the viscosity-temperature conversion chart should be studied in connection with the formulation of a lubrication recommendation for high temperature operation. By the use of such a chart one can readily determine the operating viscosity of any lubricating oil at the prevailing temperature of operations, knowing the viscosity at some two points such as 100 degrees and 210 degrees Fahr., according to the prevailing marketing specifications. Normally lubricating oils of a viscosity up to approximately 800 seconds Saybolt at 100 degrees Fahr., are specified at this particular temperature. The viscosity of heavier lubricants, however, is usually stated at 210 degrees Fahr.



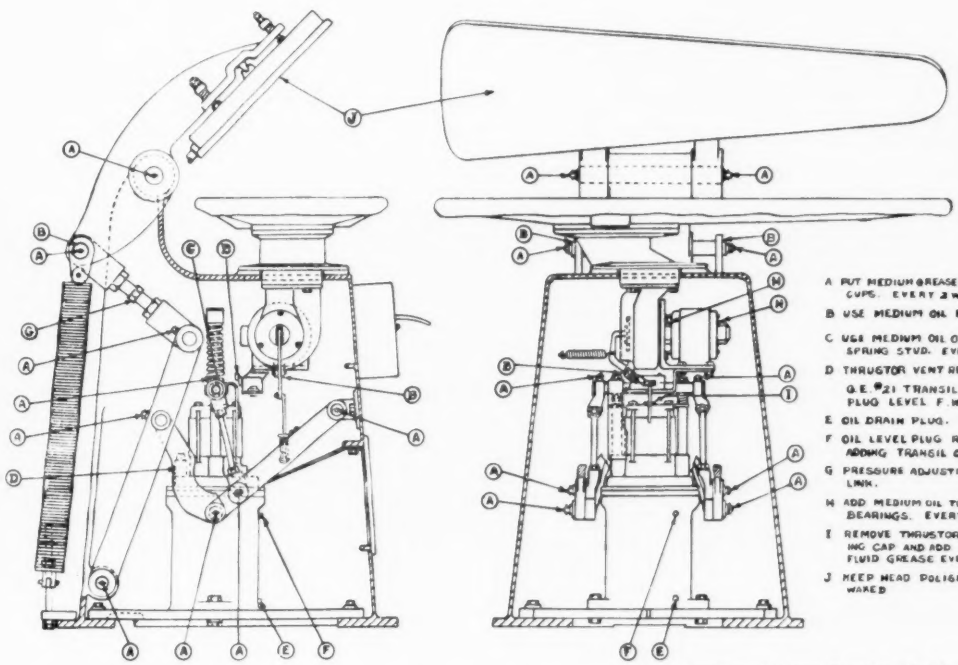
Courtesy of Link-Belt Company

Fig. 14—Showing a flat work ironing machine equipped with a Link-Belt built-in P. I. V. gear. The function of this device is to enable variable speed operation, in which power is transmitted from the input to the output shaft through a positive chain drive. The entire element is enclosed in a compact oil tight housing, enabling automatic splash lubrication.



Courtesy of The American Laundry Machinery Co.

Fig. 15—Showing lubrication diagram for right and left sides of the American Streamline Flat Work Chest Type Ironer.



Courtesy of Stewart Laundry Machinery Company

Fig. 16—Lubrication diagram for the Stewart Aerodry Press. Points requiring lubrication are indicated alphabetically with instructions as shown.

While the use of an oil of sufficient viscosity to meet the operating conditions will, of course, result in more effective lubrication, it will also prove of decided value in reducing the amount of power or energy required to move the working elements. In addition, any tendency to-

wards the development of abnormal frictional heat will be reduced.

All this will lead to improved lubrication, for it will enable the oil to perform its function more perfectly, maintaining the proper lubricating film under all conditions, by virtue of its viscosity or body.

The Importance of Viscosity

It has already been stated that viscosity varies inversely with the temperature. Under certain conditions this is an asset, for it may permit of one lubricant serving a number of points of varying external temperatures, provided the size of the wearing elements and the pressure exerted are taken into account when the lubricant is originally selected.

On the other hand, the mistake should never be made of regarding the viscosity at say 100 degrees Fahr., as of sole importance, for an oil which might be of adequate viscosity at that temperature might be too light to meet an operating temperature range at say 150 degrees Fahr. As a result, there is a direct tie-up between power consumption, friction and temperature.

Viscosity Defined

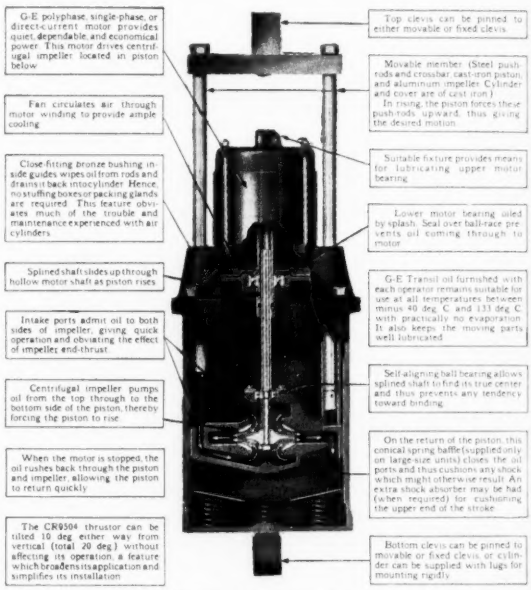
Inasmuch as "operating viscosity" plays so important a part in this matter of high temperature lubrication, a detailed knowledge of viscosity in general will be advisable. Just what is meant by the statement that an oil should have a viscosity of, let us say 500 seconds Saybolt at 100 degrees Fahr., will be vague to many. It is well, therefore, to mention that this means at a uniform temperature of 100 degrees Fahr., it will take 60 cc. of the oil in question 500 seconds to flow through the orifice of the standard Saybolt viscosimeter.

As a result, viscosity is an indication of the relative fluidity of an oil at the temperature of test. In brief, it is that inherent property by virtue of which the flow of liquids is retarded, through the resistance offered by the particles or molecules of a liquid in sliding past each other. It is, therefore, possessed by all oils in varying degrees.

Melting Point of Grease

Where a grease is involved, the operating temperatures must be given careful consideration in regard to the melting point. There are certain types of such products, of course, which by virtue of their soap content, method of manufacture and the nature of refinement of the oil used, will have a much lower melting point than others. Cup greases, for example, will show a melting point of around 200 degrees Fahr. Cylinder stock or soda soap products, however, can be compounded to show a melting point of considerably above 300 degrees Fahr.

A cup grease should not be heated above its melting point, or even within the vicinity of same, for any length of time, due to the possibility of evaporation of its normal water content and alteration of the homogeneity. This would be indicated by separation of the oil from the soap.



Courtesy of Stewart Laundry Machinery Company

Fig. 17—Details of the power unit or Thrustor, as installed on the Stewart Aerodry Press. Note that a suitable fixture is provided for lubricating the upper motor bearings. The lower bearing, however, is splashed oiled. Seal over this ball bearing prevents oil from passing to the motor. A comparatively light oil is recommended for the Thrustor chamber.

Printed in U. S. A. by
EDGAR C. RUWE CO., INC.
72 Washington St., N. Y. C.